

(NASA-CR-198830) AIR PARCEL
TRAJECTORIES IN THE LOWER
STRATOSPHERE USING WINDS FROM THE
SKYHI GENERAL CIRCULATION MODEL
(MIT) 1 p

N95-71444

Unclass

Z9/46 0056872

AIR PARCEL TRAJECTORIES IN THE LOWER STRATOSPHERE USING WINDS 2017
FROM THE "SKYHI" GENERAL CIRCULATION MODEL (NASA Research Award
NAG-1-1360), PI: R. Alan Plumb, Massachusetts Institute of Technology

56872

P-1

FINAL REPORT

- 1) The development of the 3-D particle trajectory code for use with the "SKYHI" model winds was completed. One issue that had to be faced was the resolution of the GCM wind "data" that were used to advect the trace particles. The data were available at the full GCM resolution (1° lat \times 1.2° long) every 12 hrs. Small-scale motions were aliased and we found it necessary to take 3° averages to remove erratic motion of the particles.
- 2) The code was used in numerical experiments with many (10-30 thousand) particles in order to document transport in the GCM. The first series of experiments completed comprised an investigation of transport in and near the polar vortices; results are described in Eluszkiewicz and Plumb (1995).
- 3) One of the major intentions of the planned research was investigation of stratosphere-troposphere exchange and, in particular, of the fate of pollutants emitted by supersonic aircraft. Experiments designed to explore this issue, however, revealed apparent deficiencies in the model transport that were not resolved when the project was completed.
- 4) The model developed in this project (which, despite the deficiencies noted above, is still useful for investigation the *processes*, if not the *rates*, of stratospheric transport) is being applied for more general investigations in the course of other, NASA-funded, research.

Publication:

Eluszkiewicz, J., and R.A. Plumb: Dynamics of wintertime stratospheric transport in the Geophysical Fluid Dynamics laboratory "SKYHI" general circulation model. *J. Geophys. Res.*, (to appear) 1995.